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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP 03/07941	18.07.2003	25.07.2002

International Patent Classification (IPC) or both national classification and IPC
C08L23/06

Applicant
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1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
20.01.2004	08.09.2004

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/07941

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-9 as originally filed

Claims, Numbers

1-19 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   - ☐ the description, pages:
   - ☐ the claims, Nos.:
   - ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-19
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-19
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations

see separate sheet

Novelty (Art. 33(2) PCT)

1. The document D1 (US5380803) discloses a composition for making e.g. bottles comprising A) 10-80 weight % an ethylene homopolymer (low molecular weight) having a density between 0.96 and 0.98 g/cm^3 and a melt index (MI2) between 30 and 500 g/10 min. (column 4 table 1), and B) 20-90 weight % an ethylene copolymer (high molecular weight) having a high load melt index (MI21.6) between 2 and 8 (column 5 table 2). The blend is characterised by a density between 0.945 and 0.965 g/cm^3, a melt index (MI2) between 0.1 and 2, and a molecular weight distribution between 6 and 12 (column 6 table 3). The co-monomer in the ethylene copolymer can be butene and is in an amount between 0.01-15 weight % (column 5 lines 10-35). The composition is characterised by a multi-modal behaviour (based on the indication by the applicant in the application page 2 lines 17-24) since the melt index of the two polyethylene is clearly different. The melt index of the ethylene copolymer is measured with the high load melt index (MI21.6) method since the copolymer is a high molecular weight polyethylene resin. Measuring the melt index of the ethylene copolymer according to the MI2 method would result in inaccurate results. This indicates that if the MI2 method was used to measure the melt index of the ethylene copolymer, the value of the MI2 would be very low.
Although the parameters, Vicat point, resistance to cracking (condition A) mentioned in claim 2, are not indicated in the prior art document, the subject-matter of claims 1-5,7,13,15 and 17 is not novel in the sense of (Article 33(2) PCT).

2. The document D2 (US6194520) discloses an ethylene polymer blend (bimodal) for making bottles comprising A) 40-70 wt % high molecular weight ethylene component having a density of at least 0.9 g/cc and a high melt load index (MI21) of at least 0.2 g/10 min.(claim 1), and B) 60-30 wt % a low molecular weight ethylene component having a density of at least 0.93 g/cc and a melt index (MI2) of no greater than 1000 g/10 min. (claim 1). The ethylene components are homopolymers or copolymers wherein the comonomer is butene (claims 2 and 8). The blend is characterised by a density between 0.939 and 0.96 g/cc, a polydispersity between 10 and 18 and a high load melt index of at least 5 g/10 min. (claim 3). In example 3 and 4 the melt index (MI2) of the blend is indicated (0.27 and 0.32 g/10 min. (column 14 lines 15-40).

The high molecular weight ethylene component is also characterised by a high load melt index (MI5) between 10 and 30. MI5 roughly relates to MI 2 by the factor 5:1. This indicates that a MI5 of 10 gives a MI2 of 2 (roughly). Therefore, although the parameter Vicat point mentioned in claim 2, is not indicated in the prior art document, the subject-matter of claims 1-7,9-14,16 and 17 is not novel in the sense of (Article 33(2) PCT).

3. The document D3 (WO0071615) discloses a (liquid) container formed by a (bimodal) composition comprising two polyethylenes having a different molecular weight wherein at least one of said components is an ethylene copolymer and the ethylene polymer with the lowest weight is an ethylene homopolymer (claim 11). The blend is characterised by a melt index (MI2) between 2 and 100 g/10 min., a density between 940 and 950 kg/m^3 and a molecular weight distribution between 5 and 100 (claim 12). The low molecular weight component (homopolymer) is characterised by a melt index (MI2) between 50-1000 g/10 min., a density higher than 0.965 kg/m^3 and is in 10-90 wt% present (page 6). The high molecular weight component (copolymer) is characterised by a presence of 90-10 wt % and a high load melt index (MI 21) of 33 or 01 (page 11 table 1). Although the parameters Vicat point and resistance to slow cracking mentioned in claim 2, are not indicated in the prior art document, the subject-matter of claims 1-9,12 and 15 is not novel in the sense of (Article 33(2) PCT).

4. The document D4 (WO0024821) discloses a bimodal polyethylene blend comprising a 40-80 wt% high molecular weight ethylene copolymer and 20-60 wt% low molecular weight ethylene homo- or co-polymer (claim 1). The blend is characterised by a density between 0.94-0.97 g/cm^3 and a MFR (190/21.6) between 6-14 g/10 min. and an ESCR of more than 150 hours (claim 1). The high molecular polyethylene polymer is characterised by a co-monomer content between 0.2-4 mol % e.g. butene (claim 2), a density of lower than 0.93 g/cm^3, and a MFR (190/21.6) smaller than 1.5 g/10 min. (claims 4 and 5) and a polydispersity of 1 up to 12 (claim 1). The low molecular polyethylene polymer is characterised by a co-monomer content between 0-1 mol % e.g. butene (claim 2), a density of higher than 0.95 g/cm^3, and a MFR (190/2.16) between 20-100 g/10 min. (claims 4 and 5) and a polydispersity of 2.5 up to 12 (claim 1). The ethylene polymer are prepared by e.g. two or more reactors in serie (column 2 lines 11-27).

Since the MFR condition 190 °C and 21.6 g disclosed in document D4, are higher than the MFR condition of MFR 190 °C and 2.16 g, it is clear that the MFR (190 °C and 2.16 g) of the blend and high molecular weight ethylene copolymer are lower than disclosed in D4 and therefore satisfy the MFR condition claim in the present application. The multi-modal blend is used in molding like hollow particles (Column 1 lines 13-15). The subject-matter of claims 1-5,7-16 is not novel in the sense of (Article 33(2) PCT).

Inventive Step (Art 56 PCT)

All the technical features of the present claims 1-19 are described in the documents D1-D4. Therefore the claims 1-19 do not involve an inventive step (Art. 33(3) PCT).

Clarity (Art. 6 PCT)

1. Claims 5,7,9-13 and 16 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. It is not clear from the claims which ethylene polymer is meant. The ethylene polymer can be the "A" ethylene polymer (homopolymer) or the "B" ethylene polymer (copolymer) or the blend (homopolymer and copolymer).

2. Claims 1,2,9,14 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The standard test methods used for measuring the parameters e.g. fluidity (melt) index and Vicat softening point are not disclosed.

3. Claim 7 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The structure of the claim is not clear meaning if the claim defines a "closed" or "open" claim-structure. Moreover, there is no support found in the description for the term "container which is formed only of said ethylene polymer".

4. The application does not meet the requirements of Article 6 PCT since claim 16 is defined as a "product by process" claim. The term " obtained by " is not clear. Claims for Products defined in terms of a process are admissible only if the products as such fulfill the requirements for patentability and if they cannot be defined otherwise (Guidelines C-III,4.7b).

5. Claim 17 should be reformulated to clearly define the scope of the claim. If the applicant intends to claim a "bottle" the claim should read "Bottle comprising the composition of any of the preceding claims".

6. The application does not meet the requirements of Article 6 PCT since claim 18 is defined as a "product by process" claim. The term " sterilised" is not clear. Claims for Products defined in terms of a process are admissible only if the products as such fulfill the requirements for patentability and if they cannot be defined otherwise (Guidelines C-III,4.7b).

7. Although the claims 1 and 2 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection. Hence, claims 1 and 2 do not meet the requirements of Article 6 PCT.